



Karyotypic status of shrews (*Sorex*) from Thrace, European Turkey

By J. ZIMA, LENKA SLIVKOVÁ, M. ANDREAS, P. BENDA, and A. REITER

*Institute of Animal Physiology and Genetics, Academy of Sciences of the Czech Republic, Brno and
Department of Zoology, Faculty of Science, Charles University, Prague, Czech Republic*

Receipt of Ms. 06. 12. 1996
Acceptance of Ms. 10. 04. 1997

The mountain range of Istranca (Yıldız Dağları) is situated in the easternmost tip of the Balkan peninsula, between the Black Sea and the Sea of Marmara. The area represents the south-eastern distribution limit of the forest fauna in Europe. The geographic proximity of Bosphorus, where a land bridge existed at the end of the Pleistocene (HOSEY 1982), has evoked ideas of dispersal of certain mammals of Asian origin into the area of Thrace and adjacent parts of the Balkans. ŞİMŞEK (1986) proposed the presence of the Caucasian common shrew, *Sorex satunini*, and described a new subspecies *S. satunini sultanae* from Istranca. *Sorex araneus* was not included, consequently, in the current list of the extant mammals of Turkey (DOĞRAMACI 1989), and the Istranca Mts. did not appear within the European distribution range of the species (HAUSSER et al. 1990). Similarly, the presence of another Caucasian shrew, *S. volnuchini*, could be presumed in the easternmost parts of the Balkans.

In this study, we have examined the karyotype of shrews of the genus *Sorex* from Istranca to reveal their actual taxonomic status. The chromosomes represent a particularly appropriate character for such a study, because distinct differences in the karyotype structure are known both between *S. araneus*/*S. satunini* and *S. minutus*/*S. volnuchini*, respectively (ZIMA and KRÁL 1984, for a review).

The karyotype was examined in six shrews collected in May 1992 and August 1996. The material studied included three common shrews (2 F, 1 M) and three lesser shrews (1 F, 2 M). All the specimens originated from Veliki Köprüsü bridge, approximately 8 km SW of Demirköy, Kırklareli District, 27°30' E 41°40' N (the type locality of *Sorex satunini sultanae*). Chromosome preparations were made by a standard method of direct treatment of bone marrow and spleen cells. The preparations were aged and then G-banded. The specimens examined were preserved as skulls and skins, or in alcohol, in the collection of the Department of Zoology, Charles University in Prague.

The karyotype of all the lesser shrews contained 42 chromosomes. The chromosome complement was identical to that reported in a number of populations of *S. minutus* in continental Europe and Asia (ZIMA and KRÁL 1984).

The karyotype of all the common shrews contained 24 autosomes and the composite sex chromosomes XX or XY₁Y₂. In the autosomal set, there were two large biarmed pairs (arm combinations af, bc), one small metacentric pair (tu), and three biarmed Robertsonian pairs (ik, jl, mn). The other autosomes were acrocentric (Fig. 1). This karyotype demonstrates that the studied individuals belong indisputably to *S. araneus*. However, the composition of the Robertsonian fused autosomes is quite unique among the *S. araneus* populations studied so far (ZIMA et al. 1996). Therefore, we describe here a new chromosome race.

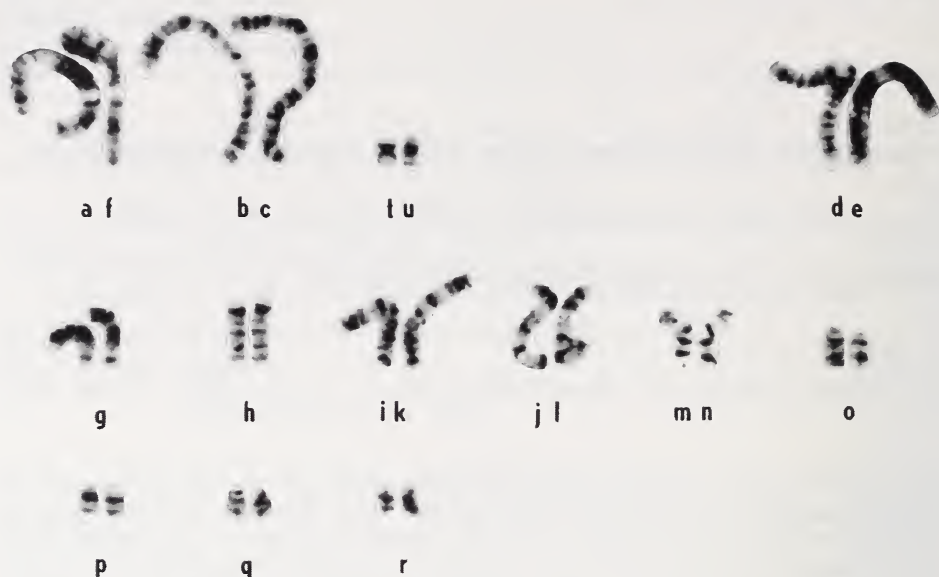


Fig. 1. The G-banded karyotype of a female of *Sorex araneus* from Istranca.

Istranca race: XX/XY₁Y₂, af, bc, g, h, ik, jl, mn, o, p, q, r, tu;

Type locality: Veliki Köprüsü bridge, Istranca Mts., Thrace, European Turkey, 27°30' E 41°40' N;

Distribution: The type locality, probably suitable habitats in higher altitudes all over the Istranca Mts.

The position of the Istranca race within the known karyotype races of *S. araneus* is apparently rather isolated. Most of the populations studied in Europe have a karyotype with the Robertsonian metacentrics gm, hi, jl, and they are usually included into the Western European Karyotypic Group, WEKG (SEARLE 1984; WÓJCIK 1993). The isolated position of the Istranca race in Europe seemed to be confirmed also in a mt DNA study (MIROL 1996).

Until now, the ik and mn metacentrics were found, along with other autosomal fusions, only in certain races described in north-eastern Poland, and included in the Eastern European Karyotypic Group, EEKG (WÓJCIK 1993; FEDYK 1995), and in four Siberian races (KRÁL and RADJABLI 1974; ANISKIN and VOLOBOUEV 1981). It is obviously improbable that the fusions ik and mn could spread in Thrace through dispersal from north-eastern Poland or even from Siberia. The areas between Istranca and Poland are populated by races with karyotypes belonging to the WEKG (ZIMA et al. 1996). The finding from Istranca thus strongly indicates the real existence of the independent origin of the same autosomal fusions in different geographical populations of *S. araneus*.

Acknowledgements

We wish to thank Mgr. JOVANA ČIHÁKOVÁ and Mgr. M. UHRIN for their help in the field work. Professor C. KURTONUR helped us in organization of the field expeditions. Dr. J. B. SEARLE kindly read through the first draft of the manuscript. This study was supported by grants Nos. 204-93-0531 (GA CR) and A6045601 (GA AS CR).

References

- ANISKIN, V. M.; VOLOBOUEV, V. T. (1981): Chromosomal polymorphism in Siberian populations of the shrews of *araneus-arcticus* complex (Insectivora, Soricidae). III. Three chromosomal forms of the common shrew *Sorex araneus* L. Genetika (Moscow) **17**, 1784–1791. [In Russian, with English summary].
- DOĞRAMACI, S. (1989): The mammalian fauna of Turkey. Ondokuz Mayıs Üniv. Fen Dergisi **1**, 107–136. [In Turkish, with English summary].
- FEDYK, S. (1995): Geographic chromosomal differentiation and hybrid zones between chromosome races of *Sorex araneus* in north-eastern Poland. Diss. Univ. Varsoviensis 439, Białystok. [In Polish, with English summary].
- HAUSSER, J.; HUTTERER, R.; VOGEL, P. (1990): *Sorex araneus* Linnaeus, 1758 – Waldspitzmaus. In: Handbuch der Säugetiere Europas. Band 3/1. Insektenfresser – Insectivora, Herrentiere – Primates. Ed. by J. NIETHAMMER and F. KRAPP. Wiesbaden: AULA-Verlag. Pp. 237–278.
- HOSEY, G. R. (1982): The Bosphorus land-bridge and mammal distribution in Asia Minor and the Balkans. Säugetierkd. Mitt. **30**, 53–62.
- KRÁL, B., RADJABLI, S. I. (1974): Banding patterns and Robertsonian fusion in the western Siberian population of *Sorex araneus* (Insectivora, Soricidae). Folia Zool. **23**, 217–227.
- MIROL, P. M. (1996): Molecular phylogenies and karyotypic evolution in small mammals: the examples of *Sorex araneus* in Eurasia and *Ctenomys* in South America. D. Phil. thesis, Univ. York.
- SEARLE, J. B. (1984): Three new karyotypic races of the common shrew *Sorex araneus* (Mammalia: Insectivora) and a phylogeny. Syst. Zool. **33**, 184–194.
- ŞİMŞEK, N. (1986): A new subspecies of *Sorex caucasicus* (Mammalia: Insectivora) from Turkey. DOĞA Tr. J. Biol. **10**, 206–208.
- WÓJCIK, J. M. (1993): Chromosome races of the common shrew *Sorex araneus* in Poland: a model of karyotype evolution. Acta theriol. **38**, 315–338.
- ZIMA, J.; FEDYK, S.; FREDGA, K.; HAUSSER, J.; MISHTA, A.; SEARLE, J. B.; VOLOBOUEV, V. T.; WÓJCIK, J. M. (1996): The list of the chromosome races of the common shrew (*Sorex araneus*). Hereditas **125**, 97–107.
- ZIMA, J.; KRÁL, B. (1984): Karyotypes of European mammals I. Acta Sc. nat. Brno **18**, 1–51.

Authors' addresses: Dr. JAN ZIMA, Mgr. LENKA SLIVKOVÁ, Mgr. MICHAL ANDREAS, Mgr. PETR BENDA, and Mgr. ANTONÍN REITER, Department of Zoology, Charles University, Viničná 7, 128 44 Praha 2, Czech Republic.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Mammalian Biology \(früher Zeitschrift für Säugetierkunde\)](#)

Jahr/Year: 1997

Band/Volume: [62](#)

Autor(en)/Author(s): Zima Jan, Reiter Antonin, Slivková Lenka, Andreas Michal, Benda Petr

Artikel/Article: [Karyotypic Status of shrews \(Sorex\) from Thrace, European Turkey 315-317](#)